



# **M1A2 SEP Tank Embedded Training Technology**

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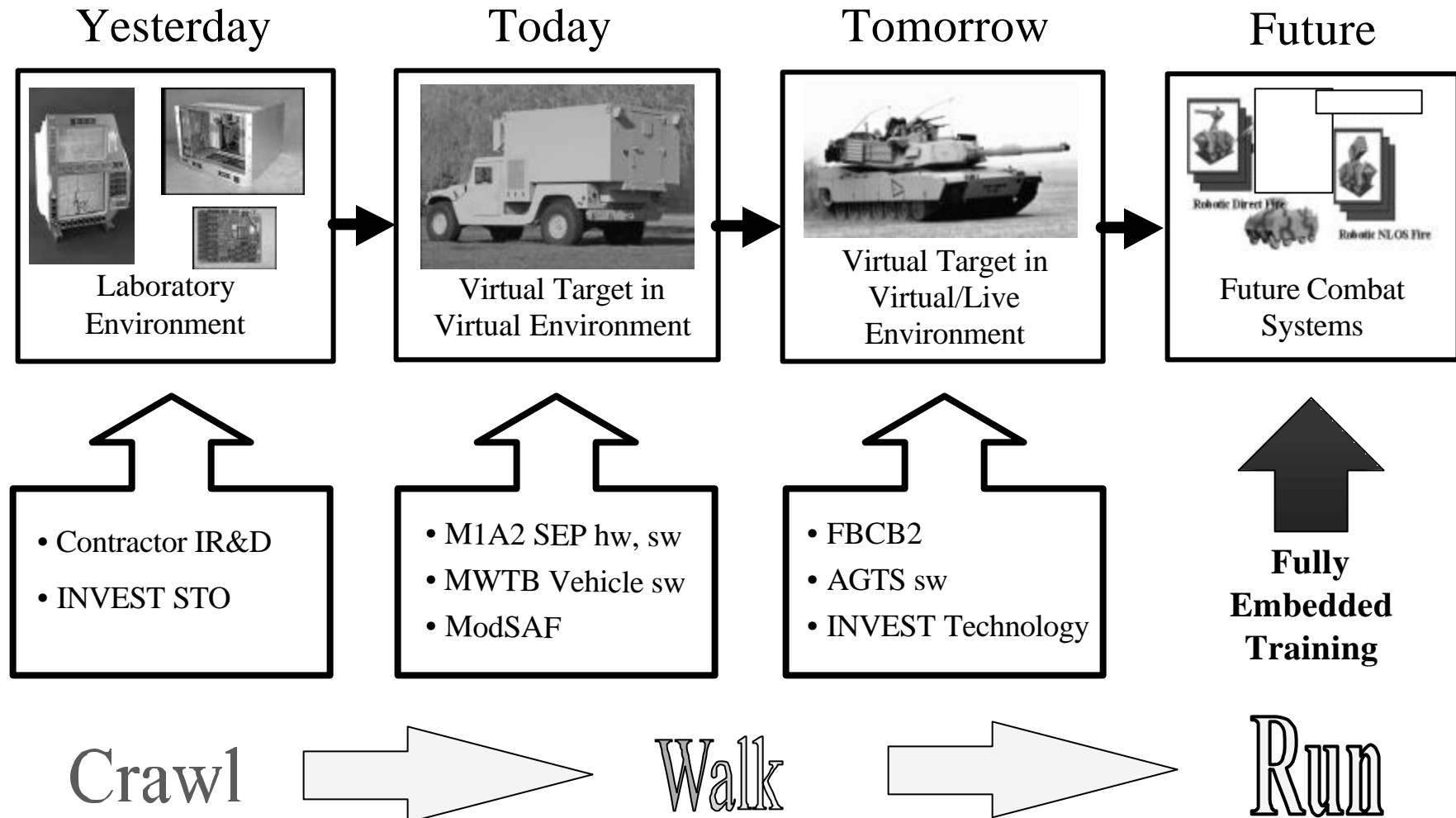
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# Embedded Training Technology



# Laboratory Based Research & Development



**Yesterday**

# Reconfigurable Test Platform



## Mobile Laboratory



- Utilized for Vehicle-on-the-Move Testing
- AM General M1097A2 HMMWV with a Military Shelter
  - 15KW Generator
  - 24,000 BTU ECU





# Mobile Crew Station Simulation Laboratory (MCSSL)



Facilitates M1A2 SEP Tank Embedded Training Technology Implementation

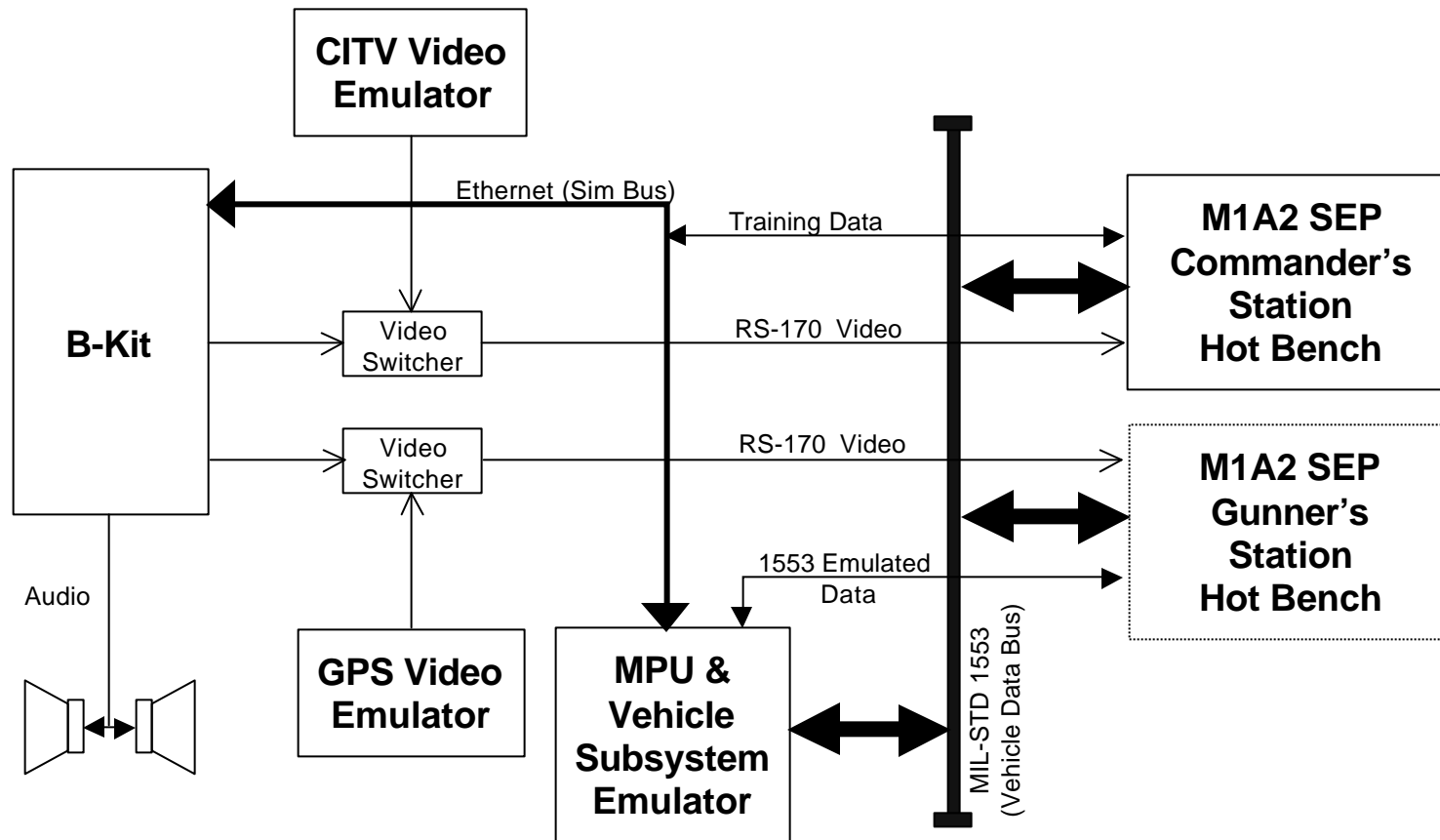
- Incorporates M1A2 SEP Tank LRUs or Commercial Equivalents
- Utilizes M1A2 SEP Tank Software
- Pre-platform Integration Risk Reduction

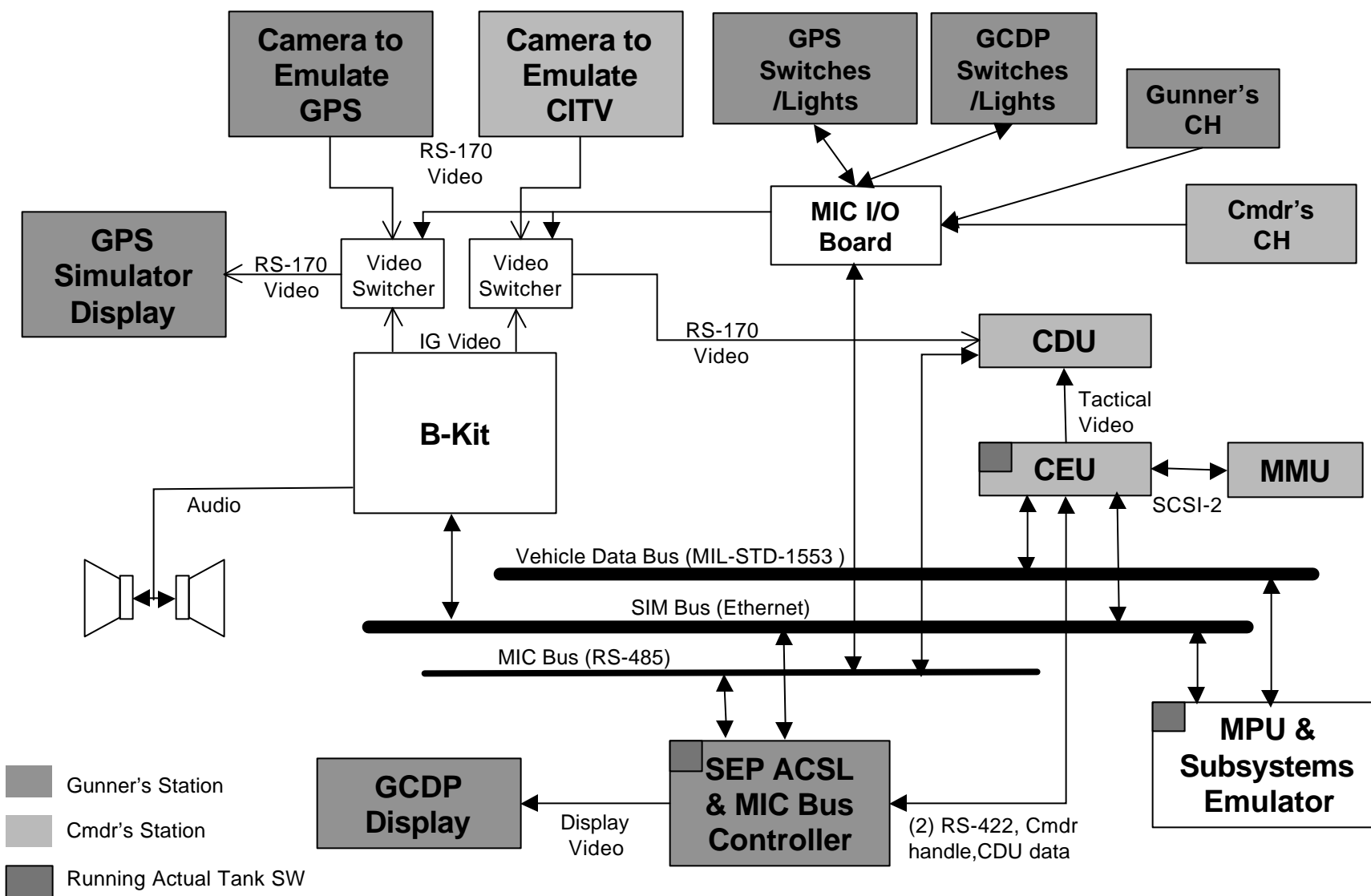
**Today**



Cost Effective • Reconfigurable • Mobile

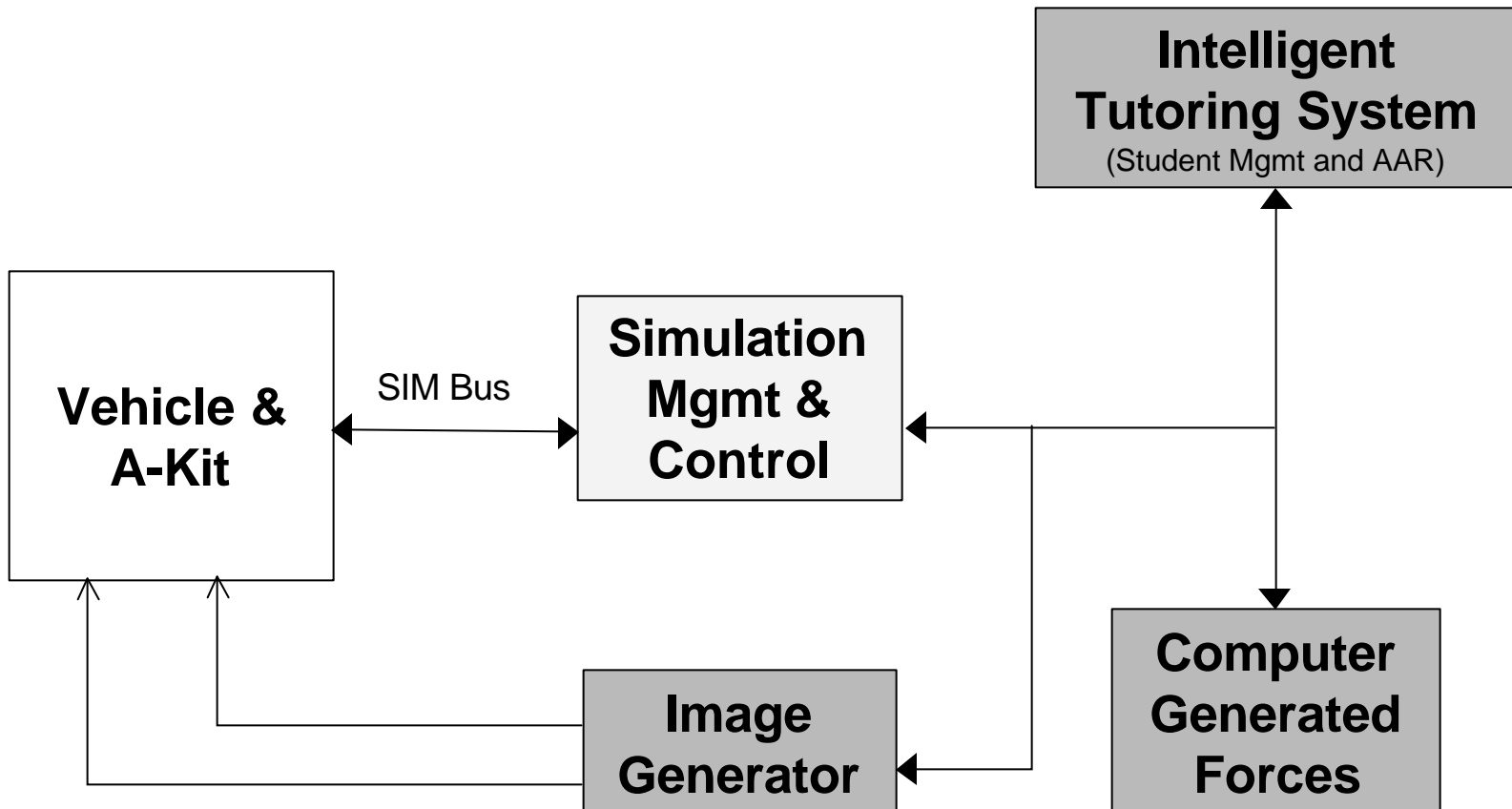
# MCSSL Top Level Functional Diagram







# B-Kit Architecture Diagram



# M1A2 SEP Tank



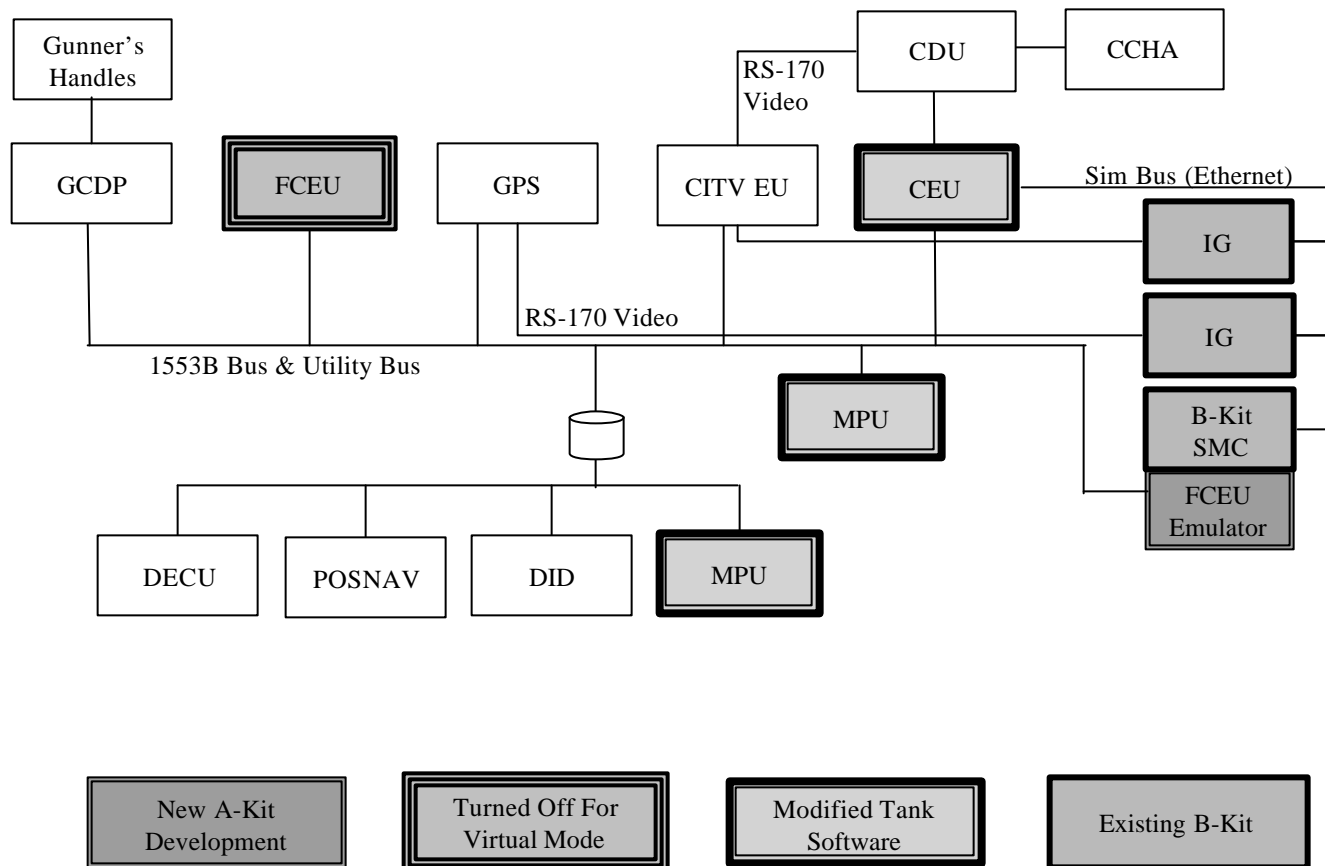


# M1A2 SEP Tank - Embedded Training Demonstrations

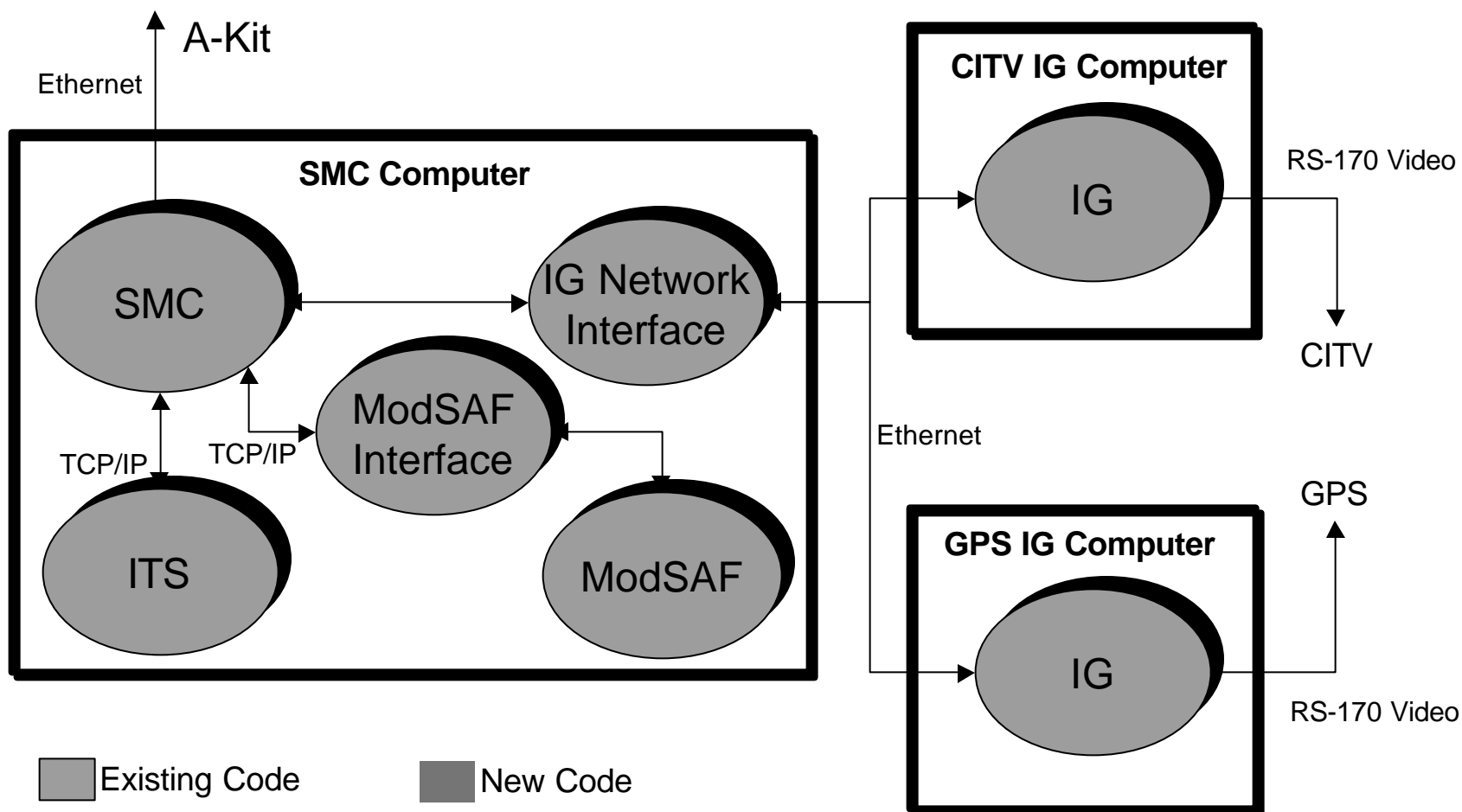


General Capabilities	Objective Demo	Initial Demo AUSA
Full Virtual Environment	X	X
After Action Review	X	No
AGTS Software Integration	X	No
Distributed Interactive Simulation (DIS)	X	Limited
<b>Gunner Station Capabilities</b>		
Gunner's Primary Sight (GPS)	X	Limited
Gunner's Control Display Panel (GCDP)	X	X
Gunner's Control Handle	X	X
<b>Commander Station Capabilities</b>		
Commander's Independent Thermal Viewer (CITV) Sight	X	X
Command & Control (including FBCB2)	X	No
Integrated Training Menus on CDU	X	X
Commander's Control Handle	X	X
<b>Hardware Features</b>		
Ruggedized Embedded Training LRUs	X	X
A-Kit for M1A2 SEP Tank	X	Limited

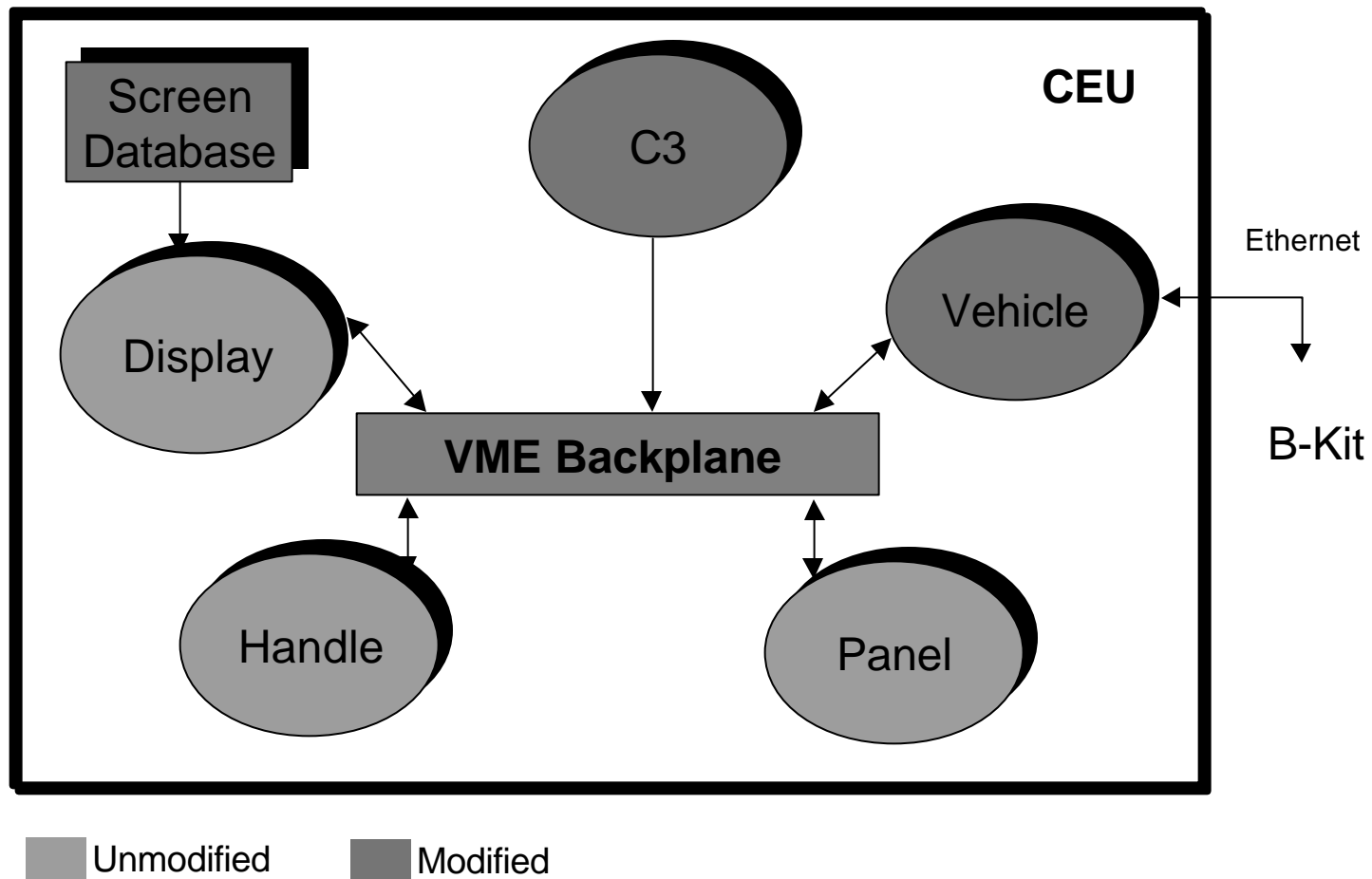
# M1A2 SEP Tank Embedded Training System Architecture



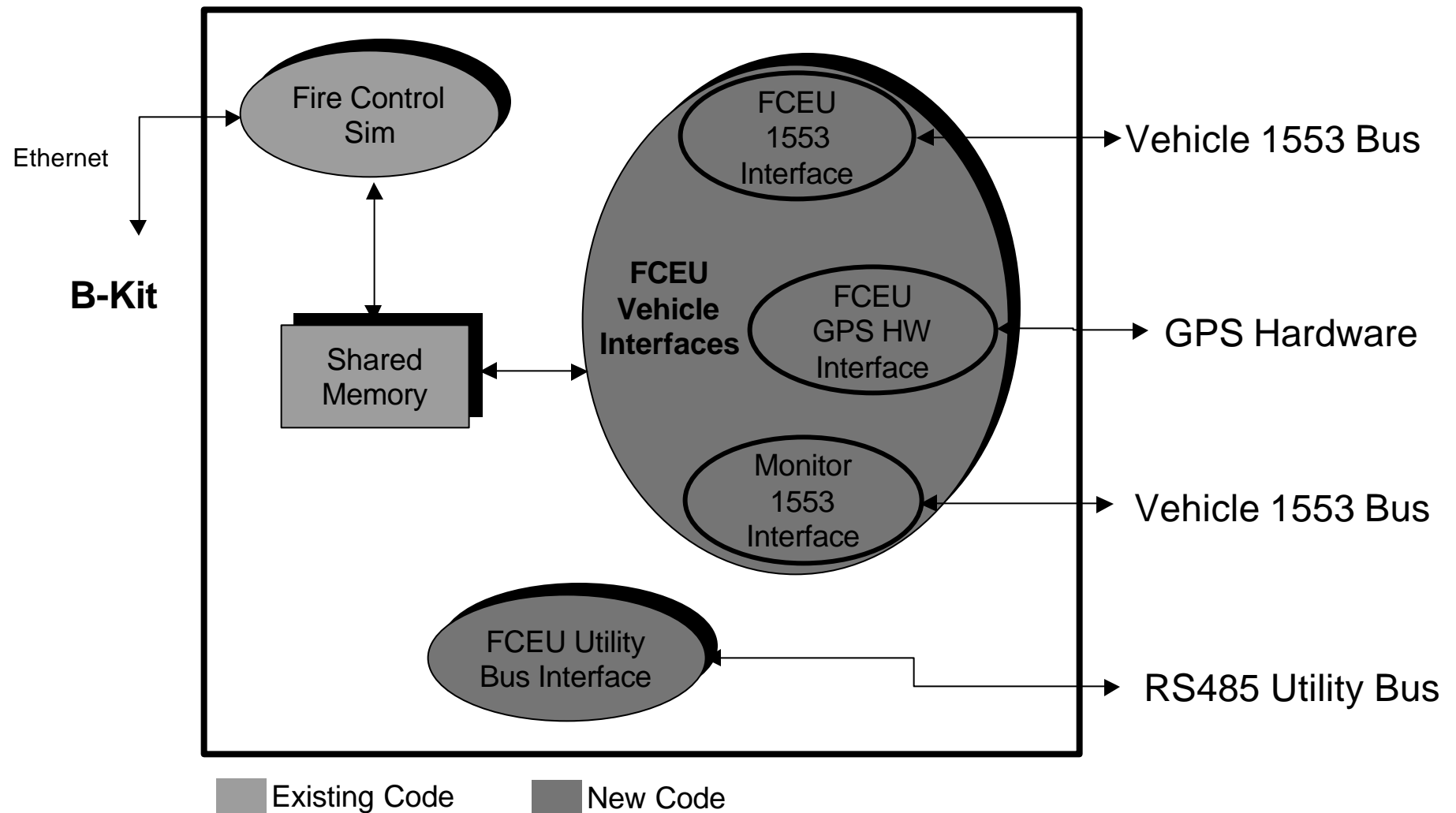
# B-Kit Architecture



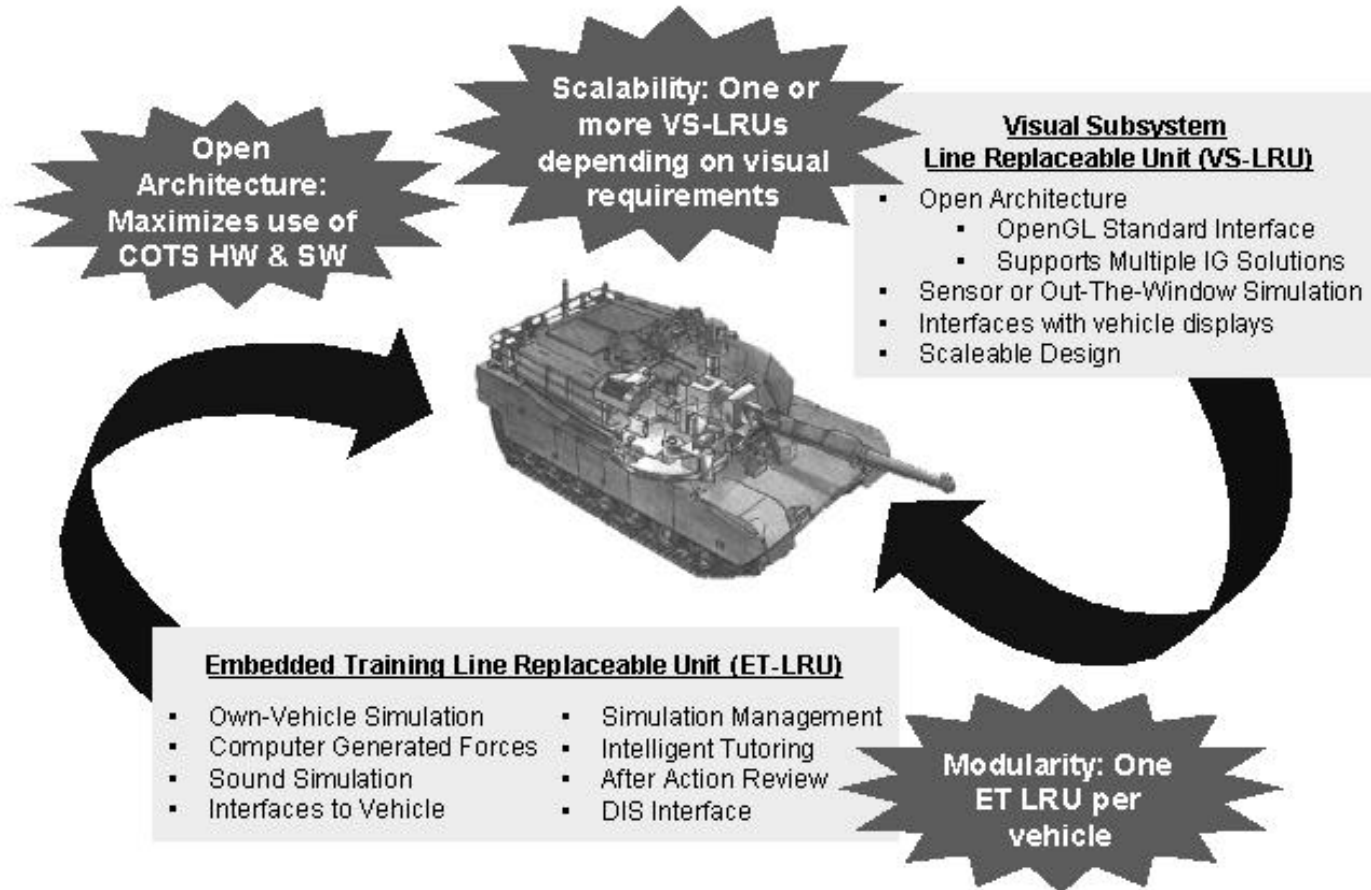
# Commander's Electronic Unit (CEU) Architecture



# FCEU Emulator Architecture



# Technical Approach - Building Block Solution



**A building block approach using an ET-LRU and multiple VS-LRUs allows for maximum flexibility and cost effectiveness**



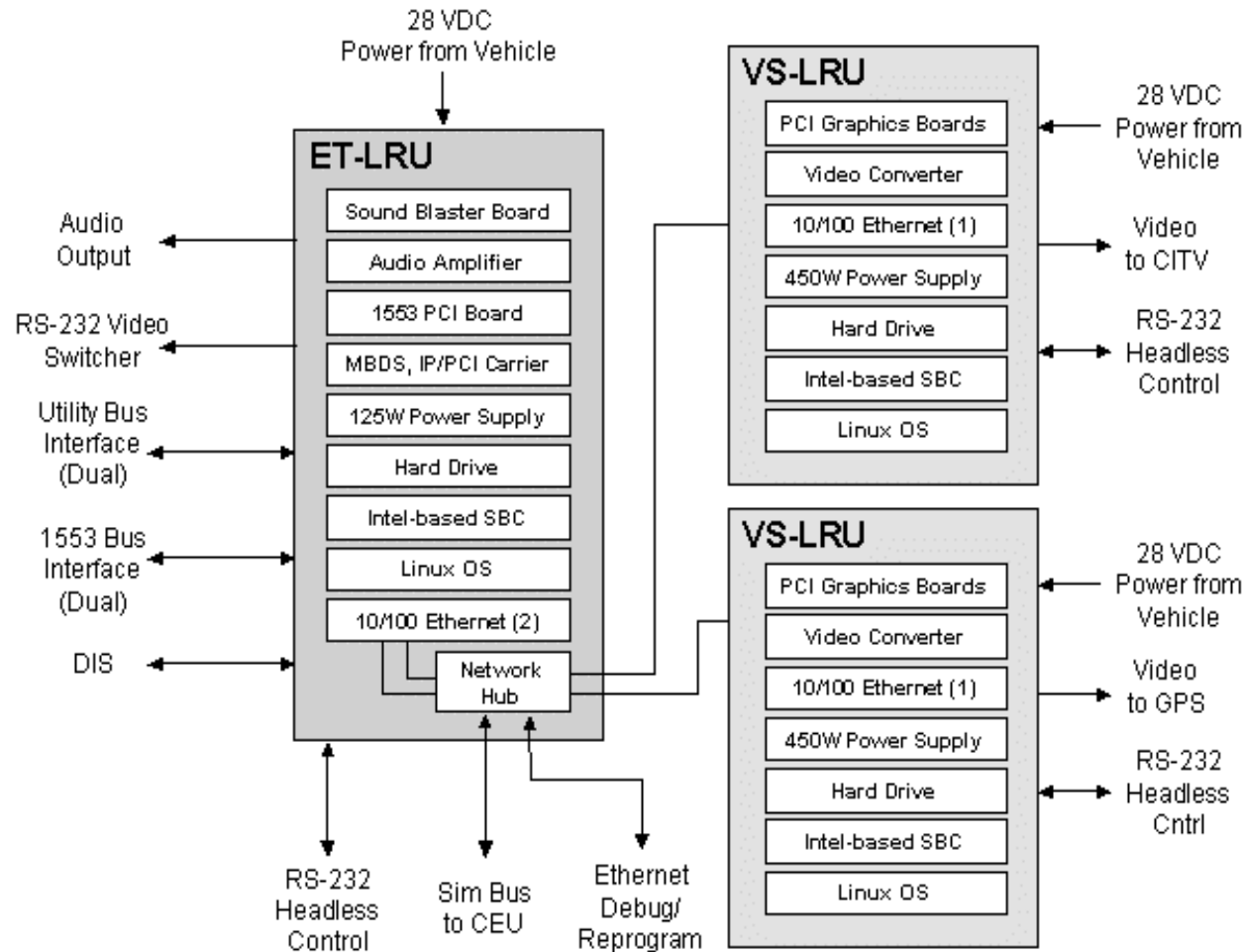


# Building Block Approach Advantages

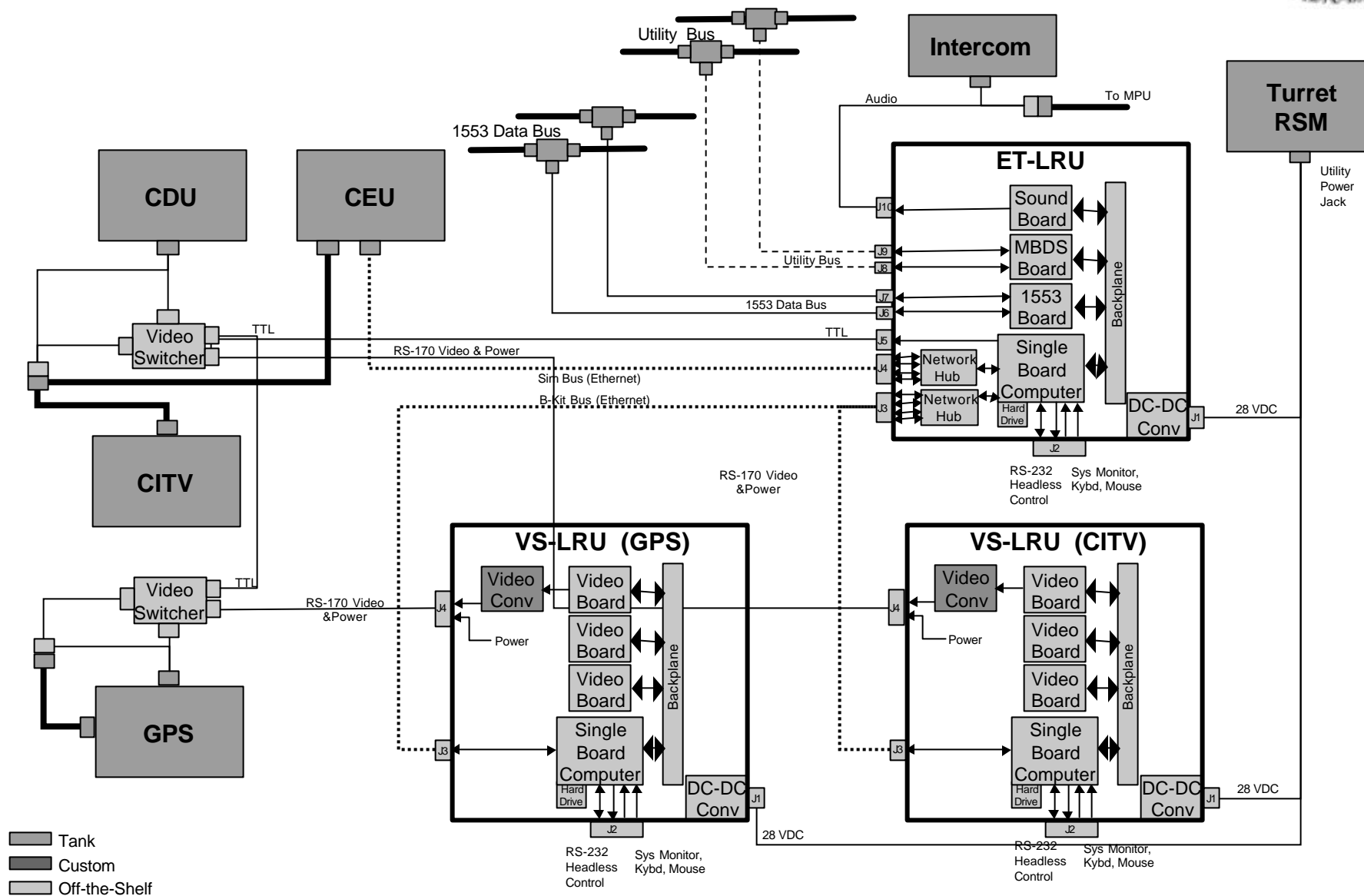


Attribute	Advantages
Placement	Placement of multiple small boxes will be easier to achieve within the tight confines of the legacy ground combat vehicle.
Environmental	Distribution of the heat loads assists in heat load management.
Power Management	Distribution of the power loads assists in power management.
Scalability	Additional capabilities (e.g., adding the driver) can be achieved by adding a VS-LRU in the driver's area.
Modularity	System modularity is achieved by logical distribution of software and hardware functions allowing changes in subsystem configuration without impacting the entire architecture.
Graceful Degradation	Failure of a single VS-LRU does not imply total system failure.

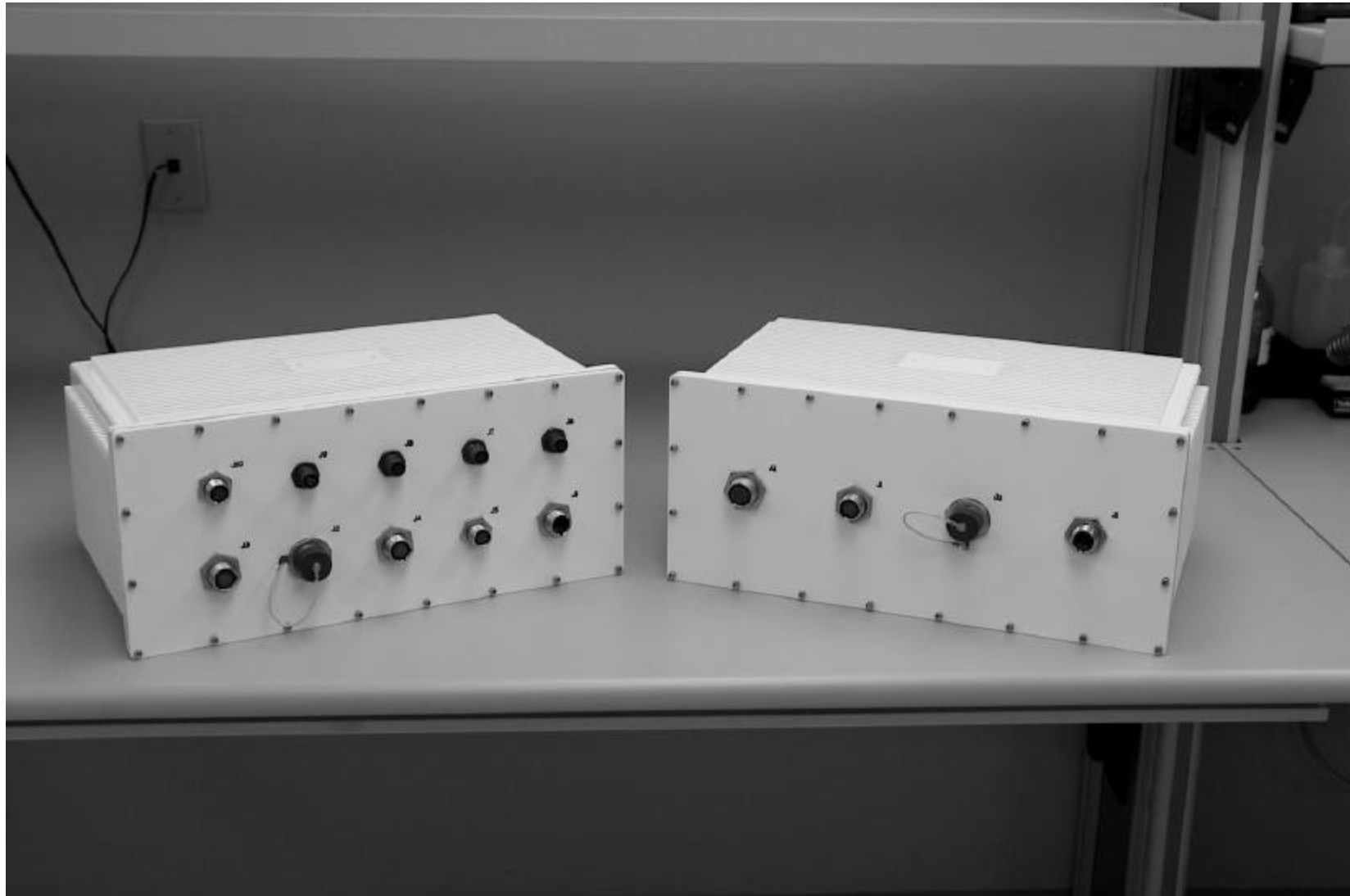
# ET & VS LRUs – Maximum Use of Common COTS SRUs



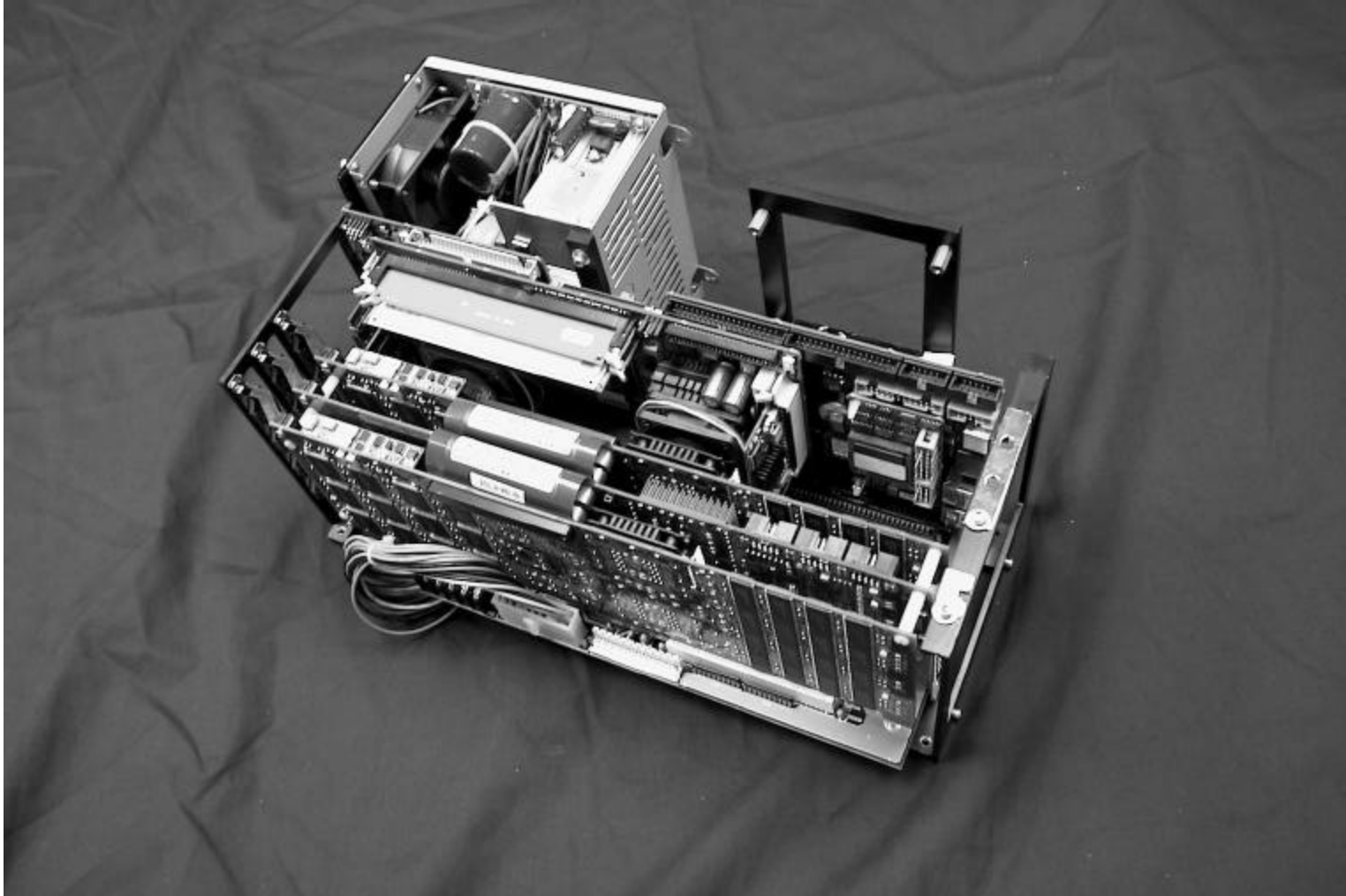
# AUSA Demo Hardware Architecture



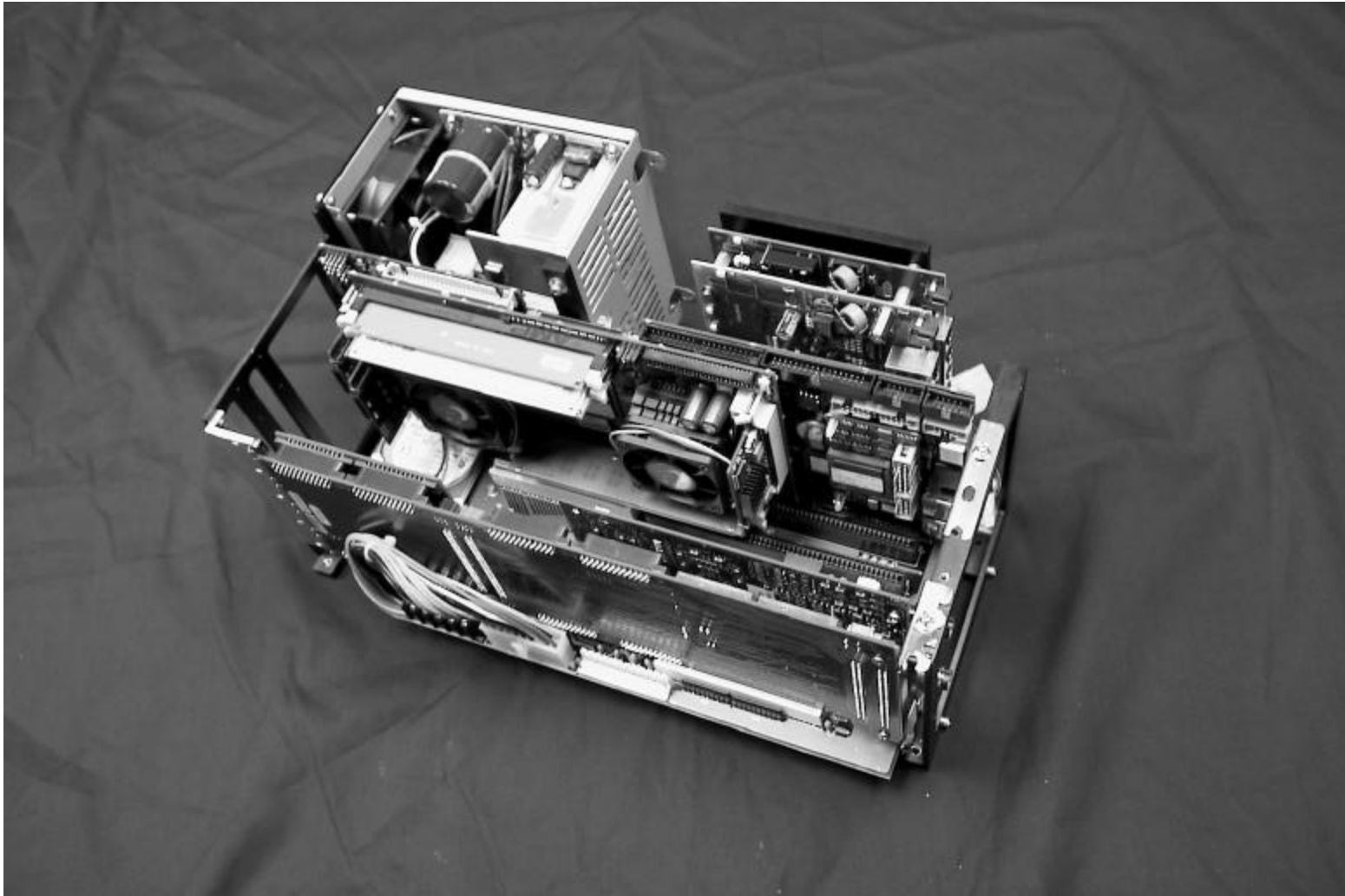
# AUSA Demo Prototype LRUs



# Visual Subsystem (VS) Prototype LRU



# Embedded Training (ET) Prototype LRU



# M1A2 SEP Tank Embedded Training Technology



M1A2 SEP Tank Block Upgrade  
FY 03/04



Requirements

Technology Transfer



MCSSL (ET R&D)

- Design & Documentation
- A/B-Kit Development

- Precision Gunnery
- Full Crew Training
- Mission Planning/Rehearsal
- Mobility Training
- Section/Platoon Gunnery
- Combined Arms Training

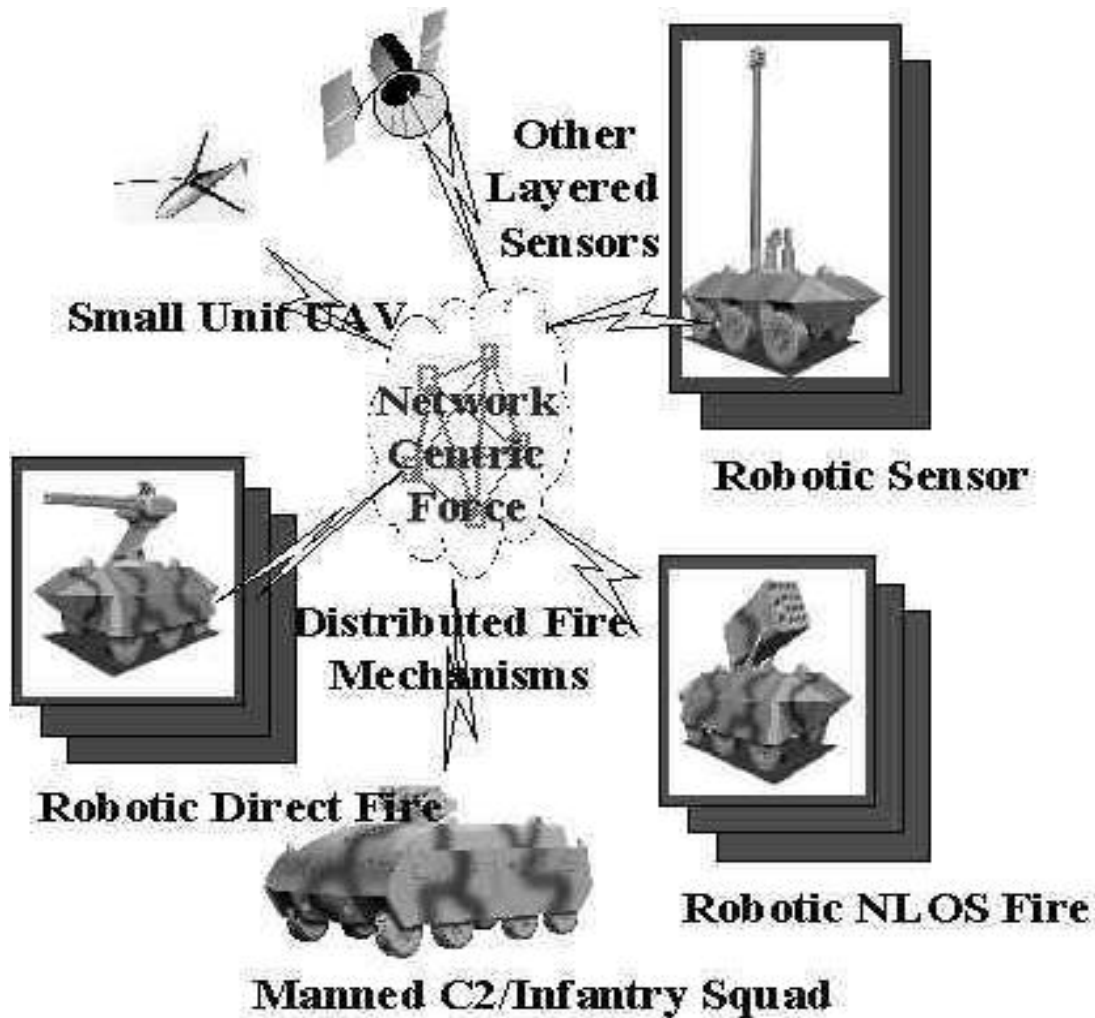


# Embedded Training Technology Challenges

- **Medium Risk Technology Challenges**
  - Hardware Miniaturization, Ruggedization, Heat Management
  - Secure High Bandwidth Inter-vehicular Communication
  - Real-time Database Development & Deployment
- **High Risk Technology Challenges**
  - Virtual Image Insertion into Live Imagery
  - Synchronized Semi-Auto Forces



# Future Combat Systems



**Future**

**Embedded Training**